

Code No: M1924/R07

Set No. 1

IV B.Tech I Semester Supplementary Examinations, Feb/Mar 2011
ARTIFICIAL INTELLIGENCE
(Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Write about problem formulation and goal formulation.
 (b) Explain 8-queens problem. [8+8]
2. (a) Define a heuristic function and explain the linear combination with an example.
 (b) Explain the hill climbing, local maximum and plateau with diagram. [8+8]
3. What is steepest ascent hill climbing? Why it is named so? Write algorithm and drawbacks. [16]
4. (a) Is exhaustive search for games such as chess is possible? Explain with your own measures.
 (b) Explain secondary research. [8+8]
5. (a) Explain, the knowledge level, logical level, and implementation level in a knowledge-based agent.
 (b) What is a horn sentence. Does a polynomial time inference procedure exist for Horn sentence?
 (c) What ontological and epistemological commitments are made by propositional logic. [6+6+4]
6. (a) Comment on propositional Vs first-order inference
 (b) How can resolution be used to show that a sentence is
 - i. valid
 - ii. unsatisfiable

For each of the following pairs of atomic sentences, give the most general unifier if it exists

 - i. $P(A,B,B), P(X,Y,Z)$
 - ii. $Q(Y, G(A,B)), Q(G(X,X),Y)$ [6+6+4]
7. (a) Give an outline of a simple planning agent
 (b) Give partial-order planning algorithm. [8+8]
8. What are decision trees? Draw a decision tree for the problem of deciding whether or not to move forward at a road intersection given that the light has just turned green. [16]

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Set No. 2

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Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
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1. Explain the Neuron and a simulated neuron with a diagram and compare. [16]
2. What is breadth first search of the search tree? Write an algorithm to conduct breadth first search explain with example and also mention advantages and disadvantages. [16]
3. (a) What is a cryptarithmic puzzle.
 (b) Solve the following cryptarithmic problem: [4+12]

C R O S S
R O A D S
D A N G E R
4. (a) Is exhaustive search for games such as chess is possible? Explain with your own measures.
 (b) Explain secondary research. [8+8]
5. (a) Describe a generic knowledge based agent.
 (b) What are the problems with propositional logic?
 (c) How can a knowledge-based agent be made fully autonomous. [6+6+4]
6. (a) Comment on propositional Vs first-order inference
 (b) How can resolution be used to show that a sentence is
 - i. valid
 - ii. unsatisfiable

For each of the following pairs of atomic sentences, give the most general unifier if it exists

 - i. $P(A,B,B), P(X,Y,Z)$
 - ii. $Q(Y, G(A,B)), Q(G(X,X),Y)$ [6+6+4]
7. (a) What are the limitations of the problem solving approach and what is the motivation behind the design of planning systems
 (b) What do you mean by state space search?
 (c) What do you mean by regression planning? [6+6+4]

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8. What are decision trees? Draw a decision tree for the problem of deciding whether or not to move forward at a road intersection given that the light has just turned green.

[16]

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Answer any FIVE Questions
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1. How new neural network architectures receive the known facts about working of human brain? Explain with diagrams. [16]
2. Explain depth first search and breadth first with neat diagrams. [8+8]
3. Explain simulated annealing algorithm with an example. [16]
4. Explain the following:
 - (a) Quiescence search
 - (b) Singular extensions
 - (c) Forward pruning
 - (d) Deep Blue. [16]
5. Jones, Smith, and Clark hold the jobs of programmer, knowledge engineer, and manager. Jones owes the programmer \$10. The manager's spouse prohibits borrowing money. Smith is not married. Your task is to figure out which person has which job. Solve the problem using propositional logic. [16]
6. (a) Comment on propositional Vs first-order inference
 (b) How can resolution be used to show that a sentence is
 - i. valid
 - ii. unsatisfiable

For each of the following pairs of atomic sentences, give the most general unifier if it exists

 - i. $P(A,B,B), P(X,Y,Z)$
 - ii. $Q(Y, G(A,B)), Q(G(X,X),Y)$ [6+6+4]
7. Let us consider a version of the milk/banana/drill shopping problem
 - (a) Let CC denote a credit card that the agent can use to buy any object. Write the description of Buy so that the agent has to have its credit card in order to buy any thing.
 - (b) Write a Pick-Up operator that enables the agent to have an object if it is portable and at the same location as the agent.

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- (c) Assume that the credit card is at home, but Have(CC) is initially false. Construct a partially ordered plan that achieves the goal, showing both ordering constraints and causal links
 - (d) Explain in detail what happens during the planning process when the agent explores a partial plan in which it leaves home without the card. [4+4+4+4]
8. (a) Explain the major issues that affect the design of the learning element.
- (b) Explain various forms of learning [8+8]

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Answer any FIVE Questions
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1. What is AI? Explain any four approaches to AI. [16]
2. What is a greedy best first search? Explain with example and diagram. [16]
3. Define a cryptarithmic puzzle? Give an example with a solution. [16]
4. Explain the following:
 - (a) Horizon effect example of chess game
 - (b) Weighted function of the chess game. [16]
5. (a) Show that the following sentences are inconsistent using propositional logic
 - i. If Jack misses many classes through illness, then he fails high school
 - ii. If Jack fails high school, then he is uneducated
 - iii. If Jack reads a lot of books, then he is not uneducated
 - iv. Jack misses many classes through illness and reads a lot of books
 (b) Some agents make inferences as soon as they are told a new sentence, while other wait until they are asked before they do any inferencing. What difference does this make at the knowledge level, the logical level, and the implementation level. [10+6]
6. (a) Comment on propositional Vs first-order inference
 (b) How can resolution be used to show that a sentence is
 - i. valid
 - ii. unsatisfiable
 For each of the following pairs of atomic sentences, give the most general unifier if it exists
 - i. $P(A,B,B), P(X,Y,Z)$
 - ii. $Q(Y, G(A,B)), Q(G(X,X),Y)$ [6+6+4]
7. Define the operator schemata for the problem of putting on shoes and socks and a hat and coat; assuming that there are no pre-conditions for putting on the hat and coat. Give a partial-order plan that is a solution, and show that there are 180 different linearizations of this solution. [16]
8. (a) Give the general model of learning agents

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(b) Explain inductive learning.

[8+8]

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